

AMENDMENT AND RESPONSE

Applicant: Tyler E. PEASE

Serial No.: 09/649,692

Examiner: Y. Horton

Art Unit: 3635

Atty. Dkt.: W1009.10-US-01 [Formerly 141.009/A]

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a first reinforcing strip having a length, a top and a bottom with the bottom being disposed in the first groove and the top facing outwardly away from the first groove, wherein the first strip extends substantially the full length of the sheet and disposed in said sheet inwardly away from the first and second edges of the sheet;

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a second reinforcing strip having a length, a top and a bottom with the bottom being disposed in the second groove and the top facing outwardly away from the second groove, wherein the second strip extends substantially the full length of the sheet and is disposed in said sheet inwardly away from the first and second edges of the sheet;

a first thin reinforcing layer bonded to the first planar side of the sheet, and extending across the top of the first and second grooves and substantially covering the entire first planar side of the sheet; and

a second thin reinforcing layer bonded to the second planar side of the sheet and extending across substantially an entire surface of second planar side.

2. The insulated wall panel of Claim 1, wherein the bottoms of the first and second strips each have two downwardly extending flanges that are oriented substantially perpendicular to the first planar side.

3. An insulated wall panel, comprising:
a rigid foam sheet with first and second planar sides and having first and second grooves extending substantially the full length of the sheet in a substantially parallel orientation in the first side of the sheet;

a first reinforcing strip having a length, a top and a bottom with the bottom being disposed in the first groove and the top facing outwardly away from the first groove, wherein the first strip extends substantially the full length of the sheet;

a second reinforcing strip having a length, a top and a bottom with the bottom being disposed in the second groove and the top facing outwardly away from the second groove, wherein the second strip extends substantially the full length of the sheet;

AMENDMENT AND RESPONSE

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a first thin reinforcing layer bonded to the first planar side of the sheet, and extending across the top of the first and second grooves and substantially covering the entire first planar side of the sheet; and

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a second thin reinforcing layer bonded to the second planar side of the sheet and extending across substantially an entire surface of second planar side, wherein the bottoms of the first and second strips each have two downwardly extending flanges that are oriented substantially perpendicular to the first planar side, and further wherein the top of the first and second reinforcing strips are mechanically textured over the length of the first and second strips to provide an improved gripping surface for drills and self tapping screws. w/hd

4. An insulated wall panel, comprising:

a rigid foam sheet with first and second planar sides and having first and second grooves extending substantially the full length of the sheet in a substantially parallel orientation in the first side of the sheet;

a first reinforcing strip having a length, a top and a bottom with the bottom being disposed in the first groove and the top facing outwardly away from the first groove, wherein the first strip extends substantially the full length of the sheet;

a second reinforcing strip having a length, a top and a bottom with the bottom being disposed in the second groove and the top facing outwardly away from the second groove, wherein the second strip extends substantially the full length of the sheet;

a first thin reinforcing layer bonded to the first planar side of the sheet, and extending across the top of the first and second grooves and substantially covering the entire first planar side of the sheet; and

a second thin reinforcing layer bonded to the second planar side of the sheet and extending across substantially an entire surface of second planar side, wherein the bottoms of the first and second strips each have two downwardly extending flanges that are oriented substantially perpendicular to the first planar side, and further wherein

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Art Unit: 3635

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the top of the first and second reinforcing strips have a plurality of holes spaced apart at predetermined intervals along the length of the first and second reinforcing strips.

5. An insulated wall panel, comprising:

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a rigid foam sheet with first and second planar sides and having first and second grooves extending substantially the full length of the sheet in a substantially parallel orientation in the first side of the sheet;

a first reinforcing strip having a length, a top and a bottom with the bottom being disposed in the first groove and the top facing outwardly away from the first groove, wherein the first strip extends substantially the full length of the sheet;

a second reinforcing strip having a length, a top and a bottom with the bottom being disposed in the second groove and the top facing outwardly away from the second groove, wherein the second strip extends substantially the full length of the sheet;

a first thin reinforcing layer bonded to the first planar side of the sheet, and extending across the top of the first and second grooves and substantially covering the entire first planar side of the sheet; and

a second thin reinforcing layer bonded to the second planar side of the sheet and extending across substantially an entire surface of second planar side, wherein the bottoms of the first and second strips each have two downwardly extending flanges that are oriented substantially perpendicular to the first planar side, and further wherein the top of the first and second reinforcing strips have a plurality of slots spaced apart at predetermined intervals along the length of the first and second reinforcing strips.

6. The insulated wall panel of any of Claims 3, 4 or 5, wherein the first reinforcing layer is bonded to the rigid foam sheet to enclose the first and second reinforcing strips [and define a first vapor barrier?] across substantially the entire first side of the sheet.

AMENDMENT AND RESPONSE

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Serial No.: 09/649,692

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Art Unit: 3635

Atty. Dkt.: W1009.10-US-01 [Formerly 141.009/A]

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7. The insulated wall panel of Claim 6, wherein the second reinforcing layer is bonded to the rigid foam sheet to define a second vapor barrier across substantially the entire second side of the sheet.

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8. The insulated wall panel of Claim 7, wherein the first and second reinforcing layers have a tensile strength at least 100 times as great as the tensile strength of the foam sheet.

9. An insulated wall panel, comprising:
a rigid foam sheet with first and second planar sides and having first and second grooves extending substantially the full length of the sheet in a substantially parallel orientation in the first side of the sheet;
a first reinforcing strip having a length, a top and a bottom with the bottom being disposed in the first groove and the top facing outwardly away from the first groove, wherein the first strip extends substantially the full length of the sheet;
a second reinforcing strip having a length, a top and a bottom with the bottom being disposed in the second groove and the top facing outwardly away from the second groove, wherein the second strip extends substantially the full length of the sheet;
a first thin reinforcing layer bonded to the first planar side of the sheet, and extending across the top of the first and second grooves and substantially covering the entire first planar side of the sheet; and
a second thin reinforcing layer bonded to the second planar side of the sheet and extending across substantially an entire surface of second planar side, wherein the bottoms of the first and second strips each have two downwardly extending flanges that are oriented substantially perpendicular to the first planar side, wherein the first reinforcing layer is bonded to the rigid foam sheet to enclose the first and second reinforcing strips and define a first vapor barrier across substantially the entire first side of the sheet, wherein the second reinforcing layer is bonded to the rigid foam sheet to

AMENDMENT AND RESPONSE

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Serial No.: 09/649,692

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Art Unit: 3635

Atty. Dkt.: W1009.10-US-01 [Formerly 141.009/A]

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define a second vapor barrier across substantially the entire second side of the sheet, wherein the first and second reinforcing layers have a tensile strength at least 100 times as great as the tensile strength of the foam sheet, and wherein a first portion of the first reinforcing layer extending across the top of the first reinforcing strip is placed in tension when the panel is bent away from the first reinforcing strip before the foam sheet will fracture at the first groove.

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10. An insulated wall panel, comprising:

a rigid foam sheet with first and second planar sides and having first and second grooves extending substantially the full length of the sheet in a substantially parallel orientation in the first side of the sheet;

a first reinforcing strip having a length, a top and a bottom with the bottom being disposed in the first groove and the top facing outwardly away from the first groove, wherein the first strip extends substantially the full length of the sheet;

a second reinforcing strip having a length, a top and a bottom with the bottom being disposed in the second groove and the top facing outwardly away from the second groove, wherein the second strip extends substantially the full length of the sheet;

a first thin reinforcing layer bonded to the first planar side of the sheet, and extending across the top of the first and second grooves and substantially covering the entire first planar side of the sheet; and

a second thin reinforcing layer bonded to the second planar side of the sheet and extending across substantially an entire surface of second planar side, wherein the bottoms of the first and second strips each have two downwardly extending flanges that are oriented substantially perpendicular to the first planar side, wherein the first reinforcing layer is bonded to the rigid foam sheet to enclose the first and second reinforcing strips and define a first vapor barrier across substantially the entire first side of the sheet, wherein the second reinforcing layer is bonded to the rigid foam sheet to define a second vapor barrier across substantially the entire second side of the sheet,

AMENDMENT AND RESPONSE

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Art Unit: 3635

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wherein the first and second reinforcing layers have a tensile strength at least 100 times as great as the tensile strength of the foam sheet, and wherein a second portion of the first reinforcing layer extending across the top of the second reinforcing strip is placed in tension when the panel is bent away from the second reinforcing strip before the foam sheet will fracture at the second groove.

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11. **(Twice Amended)** A method of manufacturing an insulated wall panel, comprising the steps of:

creating a rigid foam block having first and second opposing sides;
cutting the foam block to form a plurality of stacked individual foam sheets having first and second sides and a plurality of parallel recesses in the first side;
inserting a reinforcing strip having a top and a bottom into each of the plurality of recesses in each of the plurality of sheets, wherein the reinforcing strip has a surface finish including at least a mechanically textured top surface and a plurality of spaced apart holes, a plurality of spaced apart slots, or a combination thereof, configured to engage mechanical fasteners;

covering the tops of each of the reinforcing strips with a first thin reinforcing layer; and

bonding the first reinforcing layer to the first side of each of the foam sheets.

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12. The method of Claim 11, further comprising the steps of:
bonding a second reinforcing layer to the second side of each of the foam sheets.

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13. A method of manufacturing an insulated wall panel, comprising the steps of:

creating a rigid foam block having first and second opposing sides;

AMENDMENT AND RESPONSE

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Serial No.: 09/649,692

Examiner: Y. Horton

Art Unit: 3635

Atty. Dkt.: W1009.10-US-01 [Formerly 141.009/A]

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cutting the foam block to form a plurality of stacked individual foam sheets having first and second sides and a plurality of parallel recesses in the first side; inserting a reinforcing strip having a top and a bottom into each of the plurality of recesses in each of the plurality of sheets; covering the tops of each of the reinforcing strips with a first thin reinforcing layer; bonding the first reinforcing layer to the first side of each of the foam sheets; and bonding a second reinforcing layer to the second side of each of the foam sheets; wherein the step of cutting the foam block includes the steps of:

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drawing a hotwire frame of substantially equally spaced parallel hot wires through the block from the first side to the second opposing side of the block; simultaneously forming each of the plurality of grooves in the block with each of the hot wires in the of the hotwire frame; and completing a path through the block by substantially simultaneously separating the block into the plurality of sheets.

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14. The method of Claim 11, wherein the step of bonding the first reinforcing layer includes at least one of the following steps:

- (a) applying adhesive to the first side of each of the plurality of sheets and subsequently rolling the first reinforcing layer onto the first side;
- (b) applying adhesive to the first reinforcing layer and subsequently rolling the first reinforcing layer onto the first sides of each of the foam sheets; and
- (c) rolling the first reinforcing layer onto the first sides of the foam sheets and subsequently heating the first reinforcing layer to form a thermal bond between the first sides of the foam sheets and the first layer.

AMENDMENT AND RESPONSE

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Art Unit: 3635

Atty. Dkt.: W1009.10-US-01 [Formerly 141.009/A]

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15. The method of Claim 11, further comprising the steps of:
orienting the foam sheet with respect to a means for trimming each sheet
such that there is a predetermined distance between the means for trimming and the
reinforcing strips, and trimming an edge of the foam sheet.

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16. A method of manufacturing an insulated foam panel, comprising the steps
of:
forming a liquid matrix of expandable foam precursor;
channeling the liquid matrix out through a nozzle;
capturing the liquid matrix between two parallel and advancing thin sheets
of reinforcing material;
inserting a plurality of continuous webs of reinforcing strip between the
two sheets of reinforcing material;
maintaining the sheets in a substantially parallel, spaced-apart orientation
as they advance over a distance sufficient to permit the liquid matrix to expand, fill
substantially an entire void between the two sheets and harden in the form of a
continuously moving ribbon of insulated paneling; and
repeatedly and successively cutting the moving ribbon into a plurality of
individual insulating panels having a cut edge substantially perpendicular to the direction
of advancement.

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17. The method of Claim 16, further comprising the steps of:
unrolling a plurality of ribbons of reinforcing material at substantially the
same linear rate as the first and second sheets advance; and
roll-forming the plurality of unrolled ribbons into the plurality of
continuous webs of reinforcing strip.

AMENDMENT AND RESPONSE

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Art Unit: 3635

Atty. Dkt.: W1009.10-US-01 [Formerly 141.009/A]

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18. The method of Claim 17, further comprising the step of:
continuously trimming lateral opposed edges of the ribbon of insulated
paneling as the ribbon advances and prior to step of repeatedly and successively cutting.

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19. The method of Claim 17, wherein the step of inserting includes the steps
of:
spacing the plurality of continuous webs of reinforcing strips a
predetermined first distance apart.

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20. The method of Claim 17, wherein the steps of maintaining the sheets
includes the step of:
simultaneously maintaining the plurality of continuous webs of reinforcing
strips at the predetermined first distance apart.

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21. **(Amended)** The insulated wall panel of Claim 3, wherein the first and
second reinforcing strips include a central recessed portion configured to receive and
support the head of a fastener.

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22. The insulated wall panel of Claim 21, further comprising a plurality of
fasteners coupled to the central recessed portion of both the first and second reinforcing
strips.

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23. **(Amended)** An insulated wall panel, comprising:
a rigid foam sheet with first and second planar sides and having first and
second grooves extending substantially the full length of the sheet in a substantially
parallel orientation in the first side of the sheet and first and second opposing edges
generally parallel to the first and second grooves;

AMENDMENT AND RESPONSE

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Art Unit: 3635

Atty. Dkt.: W1009.10-US-01 [Formerly 141.009/A]

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a first reinforcing strip having a length, a top and a bottom with the bottom being disposed in the first groove and the top facing outwardly away from the first groove, wherein the first strip extends substantially the full length of the sheet and disposed in said sheet inwardly away from the first and second edges of the sheet;

a second reinforcing strip having a length, a top and a bottom with the bottom being disposed in the second groove and the top facing outwardly away from the second groove, wherein the second strip extends substantially the full length of the sheet and is disposed in said sheet inwardly away from the first and second edges of the sheet;

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a first thin reinforcing layer bonded to the first planar side of the sheet, and extending across the top of the first and second grooves and substantially covering the entire first planar side of the sheet; and

a second thin reinforcing layer bonded to the second planar side of the sheet and extending across substantially an entire surface of second planar side,

wherein the first and second reinforcing strips include a central recessed portion configured to receive and support the head of a fastener and two non recessed portions that flank the recessed portion and extending substantially the entire length of the respective first and second reinforcing strips.

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24. The insulated wall panel of Claim 23, further comprising a plurality of headed fasteners having a head that is supported in the recessed portion and a shank that extends through the recessed portion.

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25. (Amended) The insulated wall panel of Claim 3 wherein an outwardly facing surface of the first and second reinforcing strips is configured to guide the insertion of a fastener therethrough.

AMENDMENT AND RESPONSE

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Serial No.: 09/649,692

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Art Unit: 3635

Atty. Dkt.: W1009,10-US-01 [Formerly 141.009/A]

26. The insulated wall panel of Claim 25, wherein the outwardly facing surface is configured with a surface texture that guides the insertion of a fastener therethrough.

27. The insulated wall panel of Claim 25, wherein the outwardly facing surface is configured with apertures that guide the insertion of a fastener therethrough.

28. **(Amended)** The insulated wall panel of Claim 3, wherein the rigid foam sheet has a second side opposite the first side that has no reinforcing strips.

29. **(Amended)** The insulated wall panel of Claim 3, wherein lateral sides of the first and second reinforcing strips are spaced at least 6 inches away from the lateral edges of the rigid foam sheet.

30. The insulated wall panel of Claim 29, wherein the first and second reinforcing strips are generally spaced 12 inches apart.

31. **(Amended)** The insulated wall panel of Claim 3, wherein lateral sides of the first and second reinforcing strips are spaced at least 8 inches away from the lateral edges of the rigid foam sheet. The insulated wall panel of Claim 31, wherein the first and second reinforcing strips are generally spaced 16 inches apart.

32. The insulated wall panel of Claim 31, wherein the first and second reinforcing strips are generally spaced 16 inches apart.

33. **(Amended)** The insulated wall panel of Claim 3, wherein the first and second reinforcing layers primarily consist of paper, foil or plastic film.